

The TDS4 is a medium voltage, high current, thin pack disc SCR employing an amplifying gate structure. This thin package provides greater cooling thus maximizing high current performance. The amplifying gate design allows the SCR to be reliably operated at high di/dt and dv/dt conditions in various phase control applications.

#### FEATURES:

- Low On-State Voltage
- High di/dt Capability
- High dv/dt Capability
- Hermetic Ceramic Package
- Excellent Surge and I<sup>2</sup>t Ratings

#### APPLICATIONS:

- DC Power Supplies
- Motor Controls
- Plating Rectifiers

#### ORDERING INFORMATION

Select the complete 12 digit Part Number using the table below.  
 EXAMPLE: TDS4304002DH is a 3000V 4000A SCR with 300ma IGT and 12 inch gate and cathode potential leads.

PART	Voltage Rating V <sub>DRM</sub> -V <sub>RRM</sub>	Voltage Code	Current Rating I <sub>tavg</sub>	Current Code	Turn-Off T <sub>q</sub>	Gate I <sub>GT</sub>	Leads
<b>TDS4</b>	3000	<b>30</b>	4000	<b>40</b>	<b>0</b>	<b>2</b>	
	2800	<b>28</b>					
	2600	<b>26</b>			600us	300ma	12"
	2400	<b>24</b>			(typ.)	(max)	

Revised: 1/29/2008

**Absolute Maximum Ratings**

Characteristic	Symbol	Rating	Units
Repetitive Peak Voltage	$V_{DRM}-V_{RRM}$	3000	Volts
Average On-State Current, $T_C=70^{\circ}C$	$I_{T(Avg.)}$	4000	A
RMS On-State Current, $T_C=70^{\circ}C$	$I_{T(RMS)}$	6283	A
Average On-State Current, $T_C=55^{\circ}C$	$I_{T(Avg.)}$	4700	A
RMS On-State Current, $T_C=55^{\circ}C$	$I_{T(RMS)}$	7383	A
Peak One Cycle Surge Current, 60Hz, $V_R=0V$	$I_{TSM}$	80,000	A
Peak One Cycle Surge Current, 50Hz, $V_R=0V$	$I_{TSM}$	75,424	A
Fuse Coordination $I^2t$ , 60Hz	$I^2t$	2.67E+07	A <sup>2</sup> s
Fuse Coordination $I^2t$ , 50Hz	$I^2t$	2.84E+07	A <sup>2</sup> s
Critical Rate-of-Rise of On-State Current	di/dt	100	A/us
Repetitive			
Critical Rate-of-Rise of On-State Current	di/dt	300	A/us
Non-Repetitive			
Peak Gate Power, 100us	$P_{GM}$	16	Watts
Average Gate Power	$P_{G(avg)}$	5	Watts
Operating Temperature	$T_j$	-40 to+125	$^{\circ}C$
Storage Temperature	$T_{Sg.}$	-50 to+150	$^{\circ}C$
Approximate Weight		6.5	lb
		2.95	Kg
Mounting Force		16,000-20,000	lbs
		71.2 - 89.0	KNewtons

Information presented is based upon limited testing or projected capabilities. This information is subject to change without notice. The manufacturer makes no claim as to suitability for use, reliability, capability or future availability of this product.

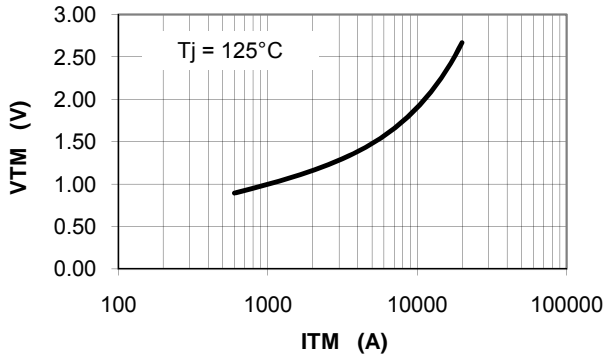
**Electrical Characteristics, Tj=25°C unless otherwise specified**

Characteristic	Symbol	Test Conditions	Rating			Units
			min	typ	max	
Repetitive Peak Forward Leakage Current	$I_{DRM}$	Tj=125°C, $V_{DRM}$ =Rated			250	ma
Repetitive Peak Reverse Leakage Current	$I_{RRM}$	Tj=125°C, $V_{RRM}$ =Rated			250	ma
Peak On-State Voltage	$V_{TM}$	Tj=125°C, $I_{TM}$ =4000A			1.38	V
$V_{TM}$ Model, Low Level	$V_0$	Tj=125°C			0.942	V
$V_{TM} = V_0 + r \cdot I_{TM}$	r	15% $I_{TM} - I_{TSM}$			9.79E-02	mΩ
$V_{TM}$ Model, High Level	$V_0$	Tj=125°C			1.175	V
$V_{TM} = V_0 + r \cdot I_{TM}$	r	$\pi \cdot I_{TM} - I_{TSM}$			7.45E-02	mΩ
$V_{TM}$ Model, 4-Term	A	Tj=125°C			-0.257	
$V_{TM} = A + B \cdot \ln(I_{TM}) +$	B	15% $I_{TM} - I_{TSM}$			0.185	
$C \cdot (I_{TM}) + D \cdot (I_{TM})^{1/2}$	C				7.73E-05	
	D				-3.20E-03	
Turn-On Delay Time	$t_d$	$V_D = 0.5 \cdot V_{DRM}$ Gate Drive: 40V - 20Ω		3		us
Turn-Off Time	$t_q$	Tj=125°C dv/dt = 20V/us to 67% $V_{DRM}$			600	us
dv/dt <sub>(Crit)</sub>	dv/dt	Tj=125°C Exp. Waveform $V_D = 67\%$ Rated	800			V/us
Gate Trigger Current	$I_{GT}$	Tj=25°C $V_D = 12V$	30	150	300	ma
Gate Trigger Voltage	$V_{GT}$		0.8	2.0	5.0	V
Peak Reverse Gate Voltage	$V_{GRM}$				5	V
Reverse Recovery Current	IR(Rec)	Tj=125°C $V_R = 100V$			300	A
Reverse Recovery Charge	QRA				10,500	μCoul

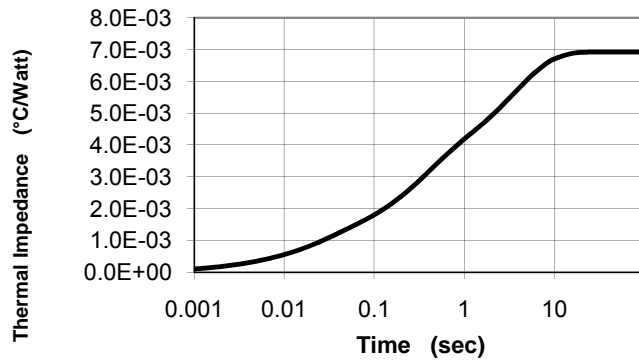
**Thermal Characteristics**

Characteristic	Symbol	Test Conditions	Rating			Units
			min	typ	max	
Thermal Resistance						
Junction to Case	$R\theta_{jc}$	Double side cooled		0.0065	0.0070	°C/Watt
Case to Sink	$R\theta_{cs}$	Double side cooled		0.001	0.0015	°C/Watt
Thermal Impedance Model						
$Z\theta_{jc}$	$Z\theta_{jc}$	Double side cooled				
$Z\theta_{jc}(t) = \sum(A(N) \cdot (1 - \exp(-t/\text{Tau}(N))))$						
where: N = 1      2      3      4						
$A(N) = 1.43E-04 \quad 9.08E-04 \quad 2.37E-03 \quad 3.50E-03$						
$\text{Tau}(N) = 2.62E-03 \quad 2.31E-02 \quad 3.05E-01 \quad 3.60E+00$						

### Maximum On-State Voltage Drop

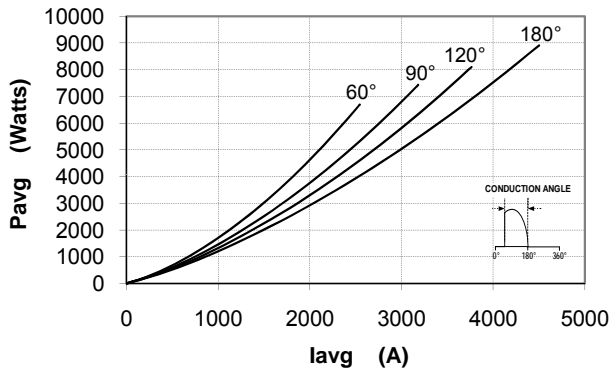


### MAXIMUM TRANSIENT THERMAL IMPEDANCE



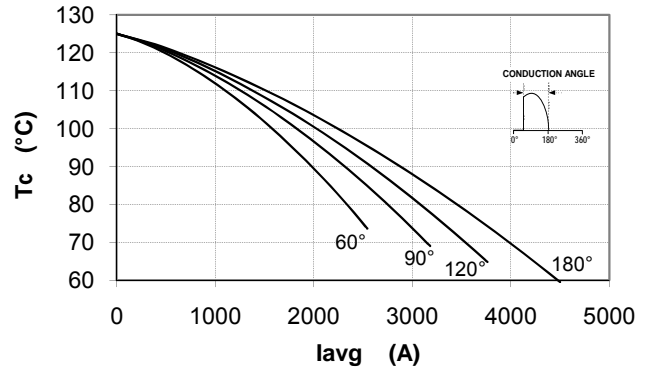
### Maximum On-State Power Dissipation

Sinusoidal Waveform



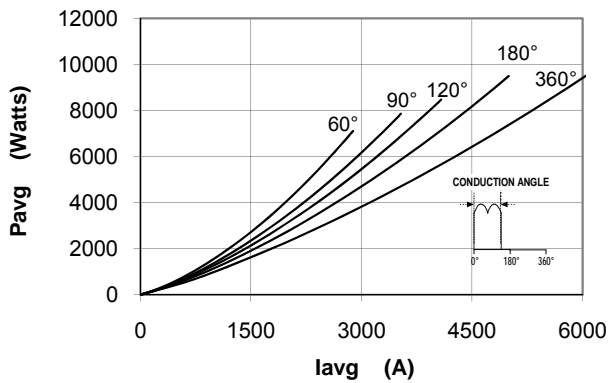
### Maximum Allowable Case Temperature

Sinusoidal Waveform



### Maximum On-State Power Dissipation

Square Waveform



### Maximum Allowable Case Temperature

Square Waveform

